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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,458	11/11/2005	Young-Duck Lee	11281-059-999	5572

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EXAMINER	
FLANIGAN, ALLEN J	

ART UNIT	PAPER NUMBER
3744	

MAIL DATE	DELIVERY MODE
06/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/522,458	LEE ET AL.	
	Examiner	Art Unit	
	Allen J. Flanigan	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-18,20 and 31-33* is/are pending in the application.

4a) Of the above claim(s) *12-18,20 and 31-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/05-3/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Applicant's election with traverse of Group I and the species of Fig. 3 in the reply filed on 2/24/2009 is acknowledged. The traversal is on the ground(s) that independent claim 1 as amended is now patentable and therefore meets the "unity of invention" standard. This is not found persuasive as demonstrated by the rejection found below.

The requirement is still deemed proper and is therefore made FINAL.

Claims 12-18, 20, and 31-33 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention or species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 2/24/2009.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madsen in view of Yamamoto et al.

Madsen shows a laminated, plate shaped heat pipe that employs a wick structure comprising fine mesh layers 16, 18 to provide capillary wicking action, and a coarse mesh layer 20 to provide a space for vapor flow. Although the device is not explicitly illustrated as being "installed between a heat source and a heat dissipating unit" as recited in claim 1, such planar heat pipes are

conventionally employed for just such an application, as shown in Yamamoto et al., and it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to install the heat pipe of Madsen between a fin set and a component to be cooled, or other heat source/sink options. Note that the combined mesh wick structure of Madsen contacts the inner surfaces of the enclosing envelope as recited in claim 1. The recitation added to claim 1 regarding the "weaving condition . . . controlled to provide a meniscus at wire junctions of the mesh", this merely recites an inherent property of any mesh, i.e. the intersection of the wires forms crevices that define sites for liquid to preferentially adhere and form a meniscus.

Regarding claims 2-5 and 7-10, the specific dimensions of the wire mesh employed as layers in the Madsen heat pipe are a matter of design choice. Madsen gives an example that employs 200X200 stainless steel mesh for layers 16 and 18, and a course 16X16 stainless steel wire mesh for layer 20, but the reference clearly is not limited in its teaching to this specific example, and Madsen recognizes the result effective nature of the mesh pore size for achieving the desired capillary action and other desired properties (see the discussion in column 2, lines 10-65). Further, it is known in the art of mesh structures that the porosity or mesh aperture diameter of a woven mesh is determined by wire spacing or density per inch and wire diameter[1]; thus, it

[1] Note for example that Yamamoto et al. teach the use of wire mesh layers of fiber diameter of 80 micrometers (0.08 mm) combined with wire mesh having a mesh number of 120 to form a capillary column, see column 18.

would have been obvious to one of ordinary skill in the art at the time the instant invention was made to select parameters for the course and fine meshes of Madsen that would provide the desired porosity, and thus hydraulic effects, for the wick layers located within the heat pipe. See MPEP 2144.05.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Madsen in view of Yamamoto et al. as applied to claim 1 above, and further in view of Bakke.

Bakke shows (Fig. 2b) a composite wick structure in which the coarse mesh wick 26 for providing vapor flow space is located next to the condensing surface 12 where heat will be rejected, and the fine pore wick structure 28 is located adjacent the evaporator surface 14 for contacting the heat source. Thus, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to eliminate one of the fine mesh layers 16, 18 of Madsen if it were desired to use the planar heat pipe in an application involving heat flow across the device from one surface to the other, as wetting of the heat rejection surface would be unnecessary.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The remaining references of record show various heat pipe designs, some with mesh wicks.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen J. Flanigan whose telephone number is (571) 272-4910. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allen J. Flanigan/
Primary Examiner, Art Unit 3744